National Park Service
U.S. Department of the Interior

Federal Lands Transportation Program

Blue Ridge Parkway Road and Bridge Reconstruction

The Linn Cove Viaduct, the last section of the Blue Ridge Parkway, was completed in 1986. Construction of the Parkway began in 1934, and road conditions have deteriorated significantly.

Mega-Project* Profile: Blue Ridge Parkway Road and Bridge Reconstruction

Estimated cost: $300-$350 million (preliminary)

Percentage of SERO, FLTP Annual Allotment: 710% to 830%

Percentage of NPS FLTP Annual Budget: 150% to 170%

The Blue Ridge Parkway. Construction of The Blue Ridge Parkway was mandated began in 1934. Inherent in the planning of the Parkway was the fundamental objective of providing opportunities to enjoy the scenic beauty of the southern Appalachian Mountains. Today's Blue Ridge Parkway is 469 miles long, but the Park manages 530 miles of roads, including secondary roads.

The Blue Ridge Parkway is ranked second among all National Parks for the inventory of assets that must be maintained. The Park maintains a landscape that is comprised of 960 scenic vistas, 366 overlooks and parking areas, more than 150 bridges, 26 tunnels, 34 miles of wooden or stone guardrail, 27 miles of fencing, and more than 1,000 miles of landscaped road shoulder.

The major rehabilitation and reconstruction of pavement, bridges, overlooks, and tunnels is essential to preserve this scenic and historic parkway, which has been nominated as a national historic landscape.

The Blue Ridge Parkway is considered the best example of rural parkway design in the country, if not the world. There is no other unit in the National Park System that can provide the variety of visual resources due to the unique flora, topography, and land use found in the southern Appalachians

An Aging and Heavily Used Parkway. It has been 76 years since construction began on the Blue Ridge Parkway. The Blue Ridge Parkway is the most visited National Park in the system with nearly 17 million visitors each year. Nearly 50 miles of the Parkway is heavily traveled by daily commuters on the sections near Roanoke, Virginia, Boone/Blowing Rock, North Carolina, and Asheville, North Carolina. The average daily traffic count in these commuter zones is 1,600, most of which occurs in approximately 3 hours each day. Visitation in these commuter zones is recorded at 45,000 to 50,000 per month.

Engineers did not anticipate the types of vehicles typically seen on the Parkway today, including buses, very large recreational vehicles, increasing numbers of motorcycles, and bicyclists, as well as more typical cars and trucks. Commercial vehicle traffic is not permitted on the Parkway, but large recreational vehicles and tour buses abound.

In the last 3-4 years, a significant amount of FLTP funds and emergency funding of nearly $15 million has been needed to stabilize failing fill slope embankments; thus, these funds were unavailable for improving pavement conditions. A significant percentage of total Parkway FLTP funding will be needed in the future to stabilize road fill slopes and rock cut slope, further depleting funding badly needed for pavement, bridge, and tunnel improvements.

Photos above demonstrate the deteriorating pavement conditions along many portions of the Blue Ridge Parkway. Poor road base and failing fill slopes are causing cracking and settling of pavement in numerous locations. Many miles of road edges are eroded, resulting in hazardous driving conditions. NPS images.

Current Pavement Conditions. The average pavement reconstruction life cycle for any given section of the Parkway is in excess of 30 years. FHWA studies indicate that approximately 45 percent (212) miles of Parkway pavement is rated "very poor" to "poor." The FHWA recommends that these 212 miles be reconstructed using the full depth pavement reclamation method. Approximately 25% of the Parkway pavement is currently in "fair" condition, but will soon require milling and repaving, with some areas requiring deep patching.

Only 30% of the Parkway pavement is currently rated "good," but these sections will also require FLTP funding for preventative maintenance to preserve that rating. All of the $2 million in preventative maintenance funding during the past five years has been used for bridge joint and bridge approach improvements. Very poor road pavement condition is one of the leading causes of the increased number of motorcycle accidents, according to a recent safety audit completed on sections of the Parkway.

Bridges. Parkway bridges—such as the world famous Linn Cove Viaduct, a box culvert cable tensioned bridge, and the bridge over the Roanoke River—are long overdue for concrete deck maintenance. Approximately 120 of the Parkway's 150 bridges need maintenance reconstruction. The 150 plus bridges on the Parkway have not had preventative maintenance completed on concrete decks for many years.

FHWA bridge engineers state that these bridges are in critical need of high performance concrete overlays or waterproofing membrane with asphalt overlays in order to meet cultural resource preservation requirements and to insure bridge ratings for load capacity are preserved.

Rehabilitation and Reconstruction Needs. Using VISI data studies, the FHWA has determined that nearly 45% of the Parkway has "very bad" to "bad" ratings, and should be reconstructed with full-depth reclamation paving technology. Originally, road base over extensive fill slopes were not stabilized and compacted with crusher-run materials as is common industry practice today. Large rock and substandard fill materials are causing the failure of fill slopes in many locations along the Parkway. There are 40 to 50-mile continuous sections of Parkway where full-depth reclamation paving could be completed. Galvanized metal culvert is rusting and failing all along the Parkway and needs to be lined or replaced with concrete or HTPE culverts. Granite and field stone headwalls have failed and need to be reconstructed or repointed.

Safety edge paving needs to be installed along the entire length of the Parkway to repair road edge erosion and unraveling caused from the impact of vehicle tires. Because road shoulders are narrow and grassy, FHWA believes safety edge will resolve road edge problems.

The Blue Ridge Parkway also needs to improve parking areas along its entire route to better accommodate large recreational vehicles and motorcycles, which is completely neglected, because no funding is available to retrofit parking areas to better accommodate multiple user types.

Projected Costs and Phasing. Full-depth paving reclamation could be completed over a period of 10 years, in 45- to 50-mile sections of the Parkway. The projected cost to complete nearly 220 miles of full-depth reclamation is approximately $220 million because waterway, culvert, headwalls, overlooks and shoulder stabilization must always be included with paving operations.

What has been and is being learned about full-depth paving reclamation can be easily carried over to the miles of Parkway that FHWA recommends be completed with this paving method.

There are approximately 10 groupings of bridges located along the Parkway that could be scheduled for concrete deck overlay work to be completed each year for a period of 10 years. The estimated cost to overlay and make additional repairs to 120 bridges is $60-$70 million (preliminary).

Parkway Tunnels Require Extensive Maintenance. There are 26 tunnels on the Parkway, and most are in need of some type of maintenance repair. Some tunnels need major reconstruction of concrete liners that are cracking, spalling, and degrading. Others still have natural stone interiors that are leaking, creating falling rock hazards.

Concrete liners use 'drainage chases' that have

Approximately 120 of the Blue Ridge Parkway's 150 bridges need maintenance and/or reconstruction.

* Mega Projects: The NPS transportation system is supported, in part, by funds from the Federal Lands Transportation Program (FLTP). Currently, the NPS is authorized an annual budget of $268 million from the FLTP. These funds are apportioned by formula among the seven NPS Regions. Most of these funds are used for "transportation asset management" – that is, to pay for the work required to keep existing assets in good condition. There are some projects, such as a major bridge repair or ship replacement, that require a much larger amount of funding than is available on an annual basis to a Region. These we call "Mega Projects." The NPS is pursuing strategies to fund these projects.

to be reconstructed to prevent ice build-up. Icing is one of the major reasons why the Parkway must routinely be closed along some sections during winter months. The drainage chases of many tunnels outlet onto road shoulders, which leads to dangerous winter driving conditions.

Today's tunnel specifications require that all drainage chases be connected to piping systems so that water is directed outside the tunnels.

FHWA has recommended that profile edge and centerline striping and highly reflective wall delineators be installed within tunnels to improve safety for bicyclists and motorists. Granite portal walls are aging and are in critical need of stone resetting and repointing.

Tunnels are typically reconstructed during low visitor season from November until May on the Parkway. Two or three tunnels could be reconstructed during the winter months so that all tunnel conditions could be upgraded from "poor" and "fair" to "good" conditions along the length of the Parkway. Cost for maintenance work on tunnels averages from $500 thousand to $1.5 million, depending on the existence or condition of the interior concrete liners and how many drainage chases need upgrading. Approximately 18 of the 26 tunnels need such work. Estimated cost is $10 to $15 million.

Future Funding. To achieve getting the Parkway pavement to an overall rating of "good," big ticket mega-projects will have to be funded and managed. Paving only 15 miles of the Parkway each year on average has meant that some sections do not get cyclically repaved for more than 30 years. At this rate, the Blue Ridge Parkway pavement will continue to deteriorate, and bad pavement ratings will increase.

Limited funding each year means that expensive project needs, such as fill or cut slope stabilization, is not addressed comprehensively. Because slope stabilization projects are so costly, they are delayed to later years when more funding might become available—or are delayed indefinitely.

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